Section 3.5
WILDLIFE

This section describes the wildlife species either known to occur or potentially occurring at the project site, summarizes results of the wildlife studies that characterize the existing wildlife present at the project site, and describes potential impacts on wildlife from construction and operation of the project.

Information used to describe the affected environment and analyze potential impacts of the project was derived primarily from Section 3.6 of the Application and the Wildlife Baseline Study report prepared by the Applicant's consultant for the Wild Horse project (WEST, Inc. 2003), which describes wildlife surveys conducted in association with the project, results of the surveys, and potential impacts on species either known to occur on the site or potentially occurring on the site. Additional information was obtained from literature review, discussion with agency personnel, and from a one-day field visit to the site.

3.5.1 Affected Environment

The project site is located within the Columbia Basin physiographic province, as defined by Franklin and Dyrness (1988). This province is characterized as having moderate topography that is incised by stream and river networks that drain toward the Columbia River.

Habitat types within the project site, which were identified and mapped by the Applicant's consultant, are described in detail in Section 3.4 Vegetation and Wetlands and are summarized here. Within the project site, 92% of the area contains shrub-steppe habitat with approximately 6% herbaceous or herbaceous/rock outcrop, and less than 1% each pine forest, woody riparian, rock outcrop, and seasonal pond. Habitat types are shown on Figure 3.4-1 in Section 3.4 Vegetation and Wetlands.

Shrub-steppe habitat within the project site is dominated by shrubs, primarily big sagebrush (*Artemesia tridentata*) and stiff sagebrush (*Artemesia rigida*), with threetip sagebrush (*Artemesia tripartita*), antelope bitterbrush (*Purshia tridentata*), and squaw current (*Ribes cereum*) occasionally dominating. The understory is composed of a mix of grasses and forbs. Shrub density and dominant species appears to generally correlate with topography and soil depth.

Herbaceous habitats in the project site are generally located on steep slopes and are generally dominated by grasses. The most abundant species in this habitat type are Sandberg's bluegrass (*Poa secunda*), bluebunch wheatgrass (*Agropyron spicatum*), Hood's phlox (*Phlox hoodii*), Hooker's balsamroot (*Balsamorhiza hookeri*), and narrowleaf goldenweed (*Haplopappus stenophyllus*).

Only one area of forest habitat occurs within the project site; it consists of a narrow strip of mature ponderosa pine (*Pinus ponderosa*) along one of the drainages in the project site. Understory species include a mixture of grasses and forbs.

Riparian habitat occurs in association with both streams and seeps/springs in the project site. Riparian habitat of streams is dominated by trees such as black hawthorn (*Crataegus douglasii*) and alder (*Alnus* sp.) with shrubs, grasses, and forbs in the understory. Riparian habitat of seeps/springs is largely degraded from livestock use and weedy species are common.

One seasonal pond occurs on the project site. This pond is thought to generally be dry by late May, although this may vary between years. There is evidence of use this pond by both livestock and wildlife.

Based on the habitat types available, the project site would be expected to provide habitat primarily for species associated with shrub-steppe habitat, with some riparian and forest dependent species also potentially occurring. To establish baseline information about wildlife use of the project site against which to evaluate impacts, the Applicant's consultant conducted a variety of wildlife surveys, including surveys for avian use, raptor nests, sage grouse, and big game. Avian use surveys included fixed-point surveys conducted over a one-year period and incidental/in-transit observations in which birds observed while traveling between fixed-points were recorded. The locations of the fixed-point survey stations are shown on Figure 3.5-1. A raptor nest survey was conducted in which the project site and lands within a 2-mile buffer were searched from a helicopter and all observations of raptor, raven, and American crow nests were recorded. Both aerial and ground surveys were conducted for sage grouse, with ground surveys focused on areas of known historical occurrence and other areas of similar habitat. Big game surveys were conducted simultaneously with the fixed-point, in-transit, and aerial raptor nest and sage grouse surveys. All fieldwork completed by the Applicant's consultant was conducted on the project site between May 10, 2002 and May 22, 2003.

Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) data for the project site was also reviewed for documented species occurrences and priority habitat identification. Priority habitats within and adjacent to the project area are shown in Figure 3.5-2.

In addition, the Applicants consultant requested and received a species list from the U.S. Fish and Wildlife Service (USFWS) that identifies species listed as threatened or endangered, species proposed for such listing, and species of concern to the USFWS that may occur in the project site.

3.5.1.1 Species Occurrence

Birds

Primary habitats for birds on the project area are the grassland/shrub-steppe and riparian communities, although some species will utilize lithosol type habitats for various resources. The various springs on site likely provide important water sources for avian species.

The project area is located within the Pacific Flyway, one of four principal north-south bird migration routes in North America. Bounded roughly by the Pacific Ocean to the west and the Rocky Mountains to the east, the Pacific Flyway extends from the arctic regions of Alaska and Canada to Central and South America. Within the flyway, certain groups of birds may travel

along narrower migration corridors. The project's location along the east flank of the Cascades places it within possible migration corridors of several bird species. Given the limited riparian and other important stopover habitat (water bodies), use by migratory birds is likely low. It would be expected that areas farther to the east along and closer to the Columbia River would be more important to migrating birds, including songbirds, waterfowl and raptors.

A total of 53 species of birds were identified during the avian point count surveys, sage grouse surveys, in-transit travel, and incidentally while conducting other field tasks at the project. Of these, 47 species were observed during the fixed-point surveys at the project site. Species observed during the point count surveys are listed in the Wildlife Baseline Study report prepared by the Applicant's consultant for the Wild Horse project (WEST, Inc. 2003). Birds observed during in-transit, raptor nest, or sage grouse surveys only were Cooper's hawk (*Accipiter cooperi*), gyrfalcon (*Falco rusticolus*), turkey vulture (*Cathartes aura*), white-crowned sparrow (*Zonotrichia leucophrys*), and Swainson's thrush (*Catharus ustulatus*). In addition, sage grouse (*Centrocerus urophasianus*) pellets were observed during sage grouse surveys but this species was not found during surveys conducted specifically for it or during other surveys conducted on the project site (WEST, Inc 2003).

A total of 1,332 individual bird detections within 512 separate groups were recorded during the fixed-point surveys. Cumulatively, three passerines and a corvid (horned lark, snow bunting, European starling and common raven) comprised approximately 53% of the observations. All other species comprised less than 5% of the observations individually. The passerine diversity was relatively low for the project, likely due to the low diversity of habitats associated with the point counts.

Passerines were the most abundant avian group observed during all seasons. Passerines showed higher abundance in spring/summer compared to fall and winter. The moderate winter use was primarily due to several large flocks of snow buntings (140 individuals). Passerines made up approximately 74% or more of the avian use in all seasons.

Raptor use was second highest to passerines in the spring/summer and third to passerines and corvids, in the fall and winter. Raptor use decreased from spring/summer to fall and more from fall and winter with American kestrels, red-tailed hawks and golden eagles the most abundant species. In all seasons, raptors made up less than 8% of the avian use.

Corvid use was similar in all seasons, and consisted of several groups of common ravens.The only waterfowl use occurred in the spring/summer, and consisted of one group of Canada geese. Low use is anticipated at this project site due to the lack of foraging and roosting habitat.

Relative exposure indices (use multiplied by proportion of observations where bird flew within the rotor-swept area) were calculated by species in order to identify which species may be most susceptible to collisions with rotors. This index is based only on flight height observations and relative abundance and does not account for other possible factors such as foraging behavior. Small bird species with the highest exposure indexes were snow bunting, European starling and gray-crowned rosy finch. The large bird species with the highest exposure index was common raven, followed by American kestrel and ring-billed gull. Mortality studies at other wind projects have indicated that although ravens are often observed at wind projects within the zone of risk, they appear to be less susceptible to collision with wind turbines than other similar size birds (e.g., raptors and waterfowl).

Spatial use of the project area was analyzed to determine whether there were areas of concentrated use by avian species within the project site. No large differences for use are apparent other than the higher use at station D from the large flocks of snow buntings, European starlings and Canadian geese observed.

Spatial patterns of raptor use were observed. The ridge along Whiskey Dick Creek near station G is effectively perpendicular to prevailing winds. There appears to be a pattern of raptor flight paths parallel to the western side of the ridge, which is consistent with behavior observed in similar situations. The one bald eagle observed was flying along the Whiskey Dick drainage. There appears to be little pattern in the flight paths in the areas of the project with less topographic relief, such as near stations D and E. The raptor flight paths near station C at the highest point of the project sometimes follow the main Whiskey Dick Mountain ridgeline and other times cross the ridgeline. The main ridgeline in this case is not perpendicular to the prevailing wind direction, likely affecting patterns of use in this area. The turbine arrangement near station C with gaps along the ridgeline may pose less collision risk for raptors compared to a long string of turbines along this ridgeline with no gaps based on these patterns of use. Most prominent saddles along the Whiskey Dick Mountain Ridge, which may have higher bird use, do not contain turbine locations. American kestrel observations did not show distinctive patterns in use of topography, but did appear more abundant near Station E, the one station where no turbines are proposed.

Raptor Nests

The majority of the study area is dominated by sagebrush habitats ranging from flat to steeply sloping draws. Raptor nesting habitat within these canyons includes relatively tall shrubs, widely scattered cliffs and rock outcrops, and occasional patches of ponderosa pine with some intermixed aspen and/or cottonwood. A few patches of ponderosa pine are also present on the north end of the search area. Overall, habitat for above ground nesting raptors is very limited within the search area.

A total of 23 nests were found during surveys, 11 of which showed no signs of raptor activity (Table 3.5-1). Species observed with active nests include red-tailed hawk, American crow and common raven. One great-horned owl was observed flying from a tree with a nest structure, but relatively dense branches prevented a good view of the nest. The status of the great-horned owl nest is considered unknown. One adult prairie falcon was observed perched on a cliff face and may have an unobserved nest within a pothole or cavity. One inactive nest was located in an area described as a historic golden eagle nest within the northern portion of the search area. No active golden eagle nests were found.

Table 3.5-1. Raptor and Other Nests Observed within Project 2-Mile Search Buffer

Species	Number of Nests	Nest Substrate				
		Cottonwood	Shrub	Pine	Radio Tower	Rock or Cliff
Red-tailed Hawk	6	2	0	2	0	2
Great-horned Owl	1	1	0	0	0	0
Prairie Falcon	1	0	0	0	0	1
American Crow	3	1	0	0	0	2
Common Raven	1	0	0	0	1	0
Inactive	11	5	1	2	0	3
Total	**23**	**9**	**1**	**4**	**1**	**8**

Big Game

The project is located within habitats designated by WDFW as winter range for mule deer and elk, is located adjacent to the Quilomene migration corridor, and the northern boundary of the project is approximately 0.5 mile (0.80 km) from the Colockum elk calving area. The Quilomene elk winter range is approximately 83,000 acres in size and winters approximately 1,500–2,000 elk. The Quilomene mule deer winter range is approximately 40,000 acres in size and winters approximately 700–800 deer. The project area is not located within the high-density deer subarea of Quilomene mule deer winter range that typically supports 100–200 deer. This area begins approximately 1.5 miles (2.4 km) to the north east of the project area, and extends to the east towards the Columbia River. The project area is also located outside of the Quilomene primary winter range, a subarea of the Quilomene winter range, which winters approximately 500 elk.

Wintering elk forage on native grass species such as Sandberg's bluegrass, which greens up with fall and winter rains, while mule deer likely utilize more shrub species in the project area. Wind-blown slopes and ridges remain snow-free most of the year. West and south-facing slopes green up earlier and provide accessible nutritious forage during the harsh winter months. Mule deer and elk also use the site during the other seasons. The riparian corridors of Whiskey Dick Creek provide some cover and the various developed and undeveloped springs provide a constant water source. Mule deer and elk hunting have been allowed on the project area lands historically.

The site appears to get some year-round use by mule deer and elk, but is more concentrated in the winter. The biologist conducting the helicopter survey on April 14, 2003 identified 129 elk in 15 groups and 331 mule deer in 27 groups within 2 miles of the project site. Several large groups (approximately four) of 50 or more elk were observed in March during reconnaissance level surveys of the project site.

Aerial surveys were conducted for deer and elk near the project in February and March by WDFW. The project area is overlapped by four different deer survey units. Three of the units were surveyed in March 2003, and a total of 1,065 deer were observed. The project area (approximately 8,600 acres) comprises about 20% of the area surveyed in 2003.

The applicant's consultant recorded all sightings of mule deer and elk while conducting other field surveys of the project. During fixed-point surveys mule deer (*Odocoileus hemionus*) were commonly observed near points E, F and G. Observations of 3–11 individuals were commonly observed in the spring/summer, with 6 or fewer individuals observed throughout the winter and fall for each observation. Elk (*Cervis elaphus*) were observed in groups of 7–26 individuals near the northern points (A, D, F and G) during the spring/summer and winter surveys, with no observations made in the fall period.

Observations of 331 mule deer within 27 groups were recorded during the raptor nest survey. In addition, 129 elk observations within 17 groups were observed. Density from this survey is approximately 7 deer per square mile and 3 elk per square mile based on this one survey. Big game likely move between the survey area, the state wildlife areas to the east, private range and agricultural lands to the west and south, and the forested lands to the north of the project.

Other Wildlife

Other species that may occur in the project site include several species of bats, other mammals including badger, coyote, pocket gopher, Paiute ground squirrels, rabbits, voles, and mice. Several species of reptiles and amphibians are also present. Townsend's ground squirrels[1] (*Spermophilus townsendii nancyae*) were seen regularly within the project site but most commonly around station B. Coyotes (*Canis latrans*) were observed on a regular basis, and white- and black-tailed jackrabbits were observed in a few locations. One species of reptile was observed during the field studies, the short-horned lizard (*Phrynosoma douglassii*).

The potential for bats to occur is based on key habitat elements such as food sources, water, and roost sites. Potential roost structures such as trees are, in general, limited within the project to "the Pines" area near Government Springs and within the riparian corridors along Whiskey Dick and Skookumchuck Creeks. The various springs within the project area may be used as foraging and watering areas. Little is known about bat species distribution, but several species of bats could occur in the project area based on the Washington GAP project and inventories conducted on the Hanford Site, Arid Lands Ecology Reserve (ALE) located in Benton County to the south and east (Table 3.5-2).

Table 3.5-2. Bat Species Potentially Occurring in Project Area

Common Name Scientific Name	Typical Habitat	Expected Occurrence in Project Area	Occurrence Documentation
California bat *Myotis californicus*	Generally found in open habitats where it forages along tree edges, riparian areas, open water; roosts in cliffs, caves, trees	Possible; documented on ALE	WA GAP Analysis Project 1999; England 2000; Fitzner and Gray 1991
small-footed myotis *Myotis ciliolabrum*	Varied arid grass/shrublands, ponderosa pine and mixed forests; roosts in crevices and cliffs; hibernates in caves, mines	Possible; documented on ALE	WA GAP Analysis Project 1999; England 2000, West et al. 1998, 1999

[1] There is some confusion over taxonomic status (Derek Stinson pers. comm.) Referred to as Paiute in Wilson and Ruff (1999) and Townsend's in Yentsen and Sherman (2003).

Common Name Scientific Name	Typical Habitat	Expected Occurrence in Project Area	Occurrence Documentation
long-eared myotis *Myotis evotis*	Primarily forested habitats and edges, juniper woodland, mixed conifers, riparian areas; roosts snags, crevices, bridges, buildings, mines	Unlikely due to habitat; not documented on ALE	WA GAP Analysis Project 1999; England 2000; TNC 1999
little brown bat *Myotis lucifugus*	Closely associated with water; riparian corridors; roosts buildings, caves, hollow trees; hibernates in caves	Possible; documented on ALE	WA GAP Analysis Project 1999; England 2000; West et al. 1998, 1999
fringed myotis *Myotis thysanodes*	Primarily forested or riparian habitats; roosts buildings, trees; hibernates in mines and caves	Possible in suitable habitat; not documented on ALE	WA GAP Analysis Project 1999; England 2000; TNC 1999
long-legged myotis *Myotis volans*	Coniferous and mixed forests, riparian areas; roosts caves, crevices, buildings, mines	Possible in suitable habitat; documented on ALE	WA GAP Analysis Project 1999; England 2000; Fitzner and Gray 1991
Yuma myotis *Myotis yumaensis*	Closely associated with water; varied habitats: riparian, shrublands, forests woodlands; roosts in mines, buildings, caves, bridges	Possible; documented on ALE	WA GAP Analysis Project 1999; England 2000; West et al. 1998, 1999
hoary bat *Lasiurus cinereus*	Forested habitats, closely associated with trees; roosts in trees; migratory species	Possible in suitable habitat; probable migrant; documented on ALE	WA GAP Analysis Project 1999; England 2000; West et al. 1998, 1999
silver-haired bat *Lasionycteris noctivagans*	Forested habitats; generally coniferous forests; roosts under bark; believed to be a migratory species	Possible in suitable habitat; probable migrant; documented on ALE	WA GAP Analysis Project 1999; England 2000; West et al. 1998, 1999
western pipistrelle *Pipistrellus hesperus*	Primarily desert lowlands; desert shrublands; canyons; roosts under rocks, crevices and possibly in sagebrush	Possible; documented on ALE	WA GAP Analysis Project 1999; England 2000; West et al. 1998, 1999
big brown bat *Eptesicus fuscus*	Generally deciduous forests; buildings; roosts in buildings, trees, crevices; hibernates in caves, mines	Possible; documented on ALE	WA GAP Analysis Project 1999; England 2000; West et al. 1998, 1999
spotted bat *Euderma maculatum*	Varied habitat—pine forests to desert scrub with nearby cliffs; roosts in crevices, cliff faces	Unlikely due to rarity; not documented on ALE	WA GAP Analysis Project 1999; England 2000; TNC 1999
Townsend's big-eared bat *Corynorhinus townsendii*	Varied habitats—forests to desert scrub; roosts in buildings, caves, mines, bridges; hibernates in caves	Possible in suitable habitat; not documented on ALE	WA GAP Analysis Project 1999; England 2000; TNC 1999

Common Name Scientific Name	Typical Habitat	Expected Occurrence in Project Area	Occurrence Documentation
pallid bat *Antrozous pallidus*	Generally occurs in arid regions, desert scrub habitats; roosts in cliff faces, caves, mines, buildings	Unlikely due to lack of suitable habitat; documented on ALE	WA GAP Analysis Project 1999; England 2000; West et al. 1998, 1999

Notes:

[a] GAP Analysis Program (GAP). The Washington State GAP Analysis Project is based on two primary data sources: vegetation types (actual vegetation, vegetation zone, and ecoregion) and species distribution. The two data sources are combined to map the predicted distribution of vertebrate species. More information about the Washington Gap Analysis Project can be found on the WDFW web page: www.wa.gov/wdfw/wlm/gap/dataprod.htm

Twenty-seven species of reptiles and amphibians occur in Kittitas County and could be present in the project area. Short-horned lizards were commonly observed within the project area. Other reptiles that may likely occur in the project site include snakes such as the yellow-bellied racer (*Colubor constrictor mormon*) and rattlesnakes (*Crotalus* spp.). Amphibian and aquatic reptile habitat is limited within the project area. No migration corridors for reptiles or amphibians are known to be present in the project area. Many amphibians migrate short distances during spring or fall breeding periods to and from suitable wetlands and during fall dispersal of juveniles.

Unique Species

A list of state and federally protected species that potentially occur within the project area was generated to assess the potential for impacts on these species (see Table 3.5-3). Species were identified based on the WDFW Species of Concern list, which includes state listed endangered, threatened, sensitive, and candidate species; and the USFWS, Central Washington Ecological Services office list of Endangered, Threatened, Proposed, Candidate and Species of Concern for Kittitas County.

Information about occurrence of these species in the project area is based largely on the following resources:

- Habitat mapping and predicted distribution from Washington State GAP Analysis Program (GAP) project;
- WDFW Priority Habitats and Species (PHS) records for the project area and a buffer or approximately 5 miles (8 km);
- Breeding Bird Atlas of Washington State, Location Data and Predicted Distributions (Smith et al. 1997);
- Baseline field studies being conducted on site (this report); and
- Other published literature where available.

Threatened and Endangered Species

The species list provided to the Applicant's consultant by the USFWS indicated the following threatened, endangered or candidate wildlife species as potentially occurring on the project site: bald eagle, gray wolf, Canada lynx, northern spotted owl, western sage grouse, and western yellow billed cuckoo. Based on the habitat attributes present on the project site and the habitats with which these species are associated, only bald eagle and western sage grouse have the potential to occur within the project site.

This letter also indicated the potential presence of critical habitat for the northern spotted owl on the project site. The Endangered Species Act defines critical habitat for threatened or endangered species as specific area(s) within the geographical range of a species where physical or biological features are found that are essential to the conservation of the species and which may require special management consideration or protection. Critical habitat is a specific geographic area designated by the USFWS for a particular species.

Under the ESA, it is unlawful to adversely modify designated critical habitat. According to the USFWS letter, critical habitat for the northern spotted owl may be present at or near the proposed wind plant. However, it was determined that no critical spotted owl habitat is present within the project area after further review of critical habitat maps by the USFWS (Skip Stonesifer, USFWS pers. comm.).

Other Special Status Species

Other special status species potentially occurring in the project site are listed in Table 3.5-3.

Table 3.5-3. Special Status Species Documented as Occurring or Likely to Occur in Project Vicinity

Group/Species	Status[a]	Notes
Mammals		
black-tailed jack rabbit (*Lepus californicus*)	SC	Documented as occurring near the project area. The species is likely to occur within the project area due to the presence of suitable sagebrush and shrub habitats.
white-tailed jack rabbit (*Lepus townsendi*)	SC	Documented as occurring near the project area. The species is likely to occur within the project area due to the presence of suitable sagebrush and shrub habitats.
brush prairie pocket gopher (*Thomomys talpoides douglasi*)	SC	Project occurs within the potential range of the species. No individuals have been documented near the Project area.
Merriam's shrew (*Sorex merriami*)	SC	Project occurs within the potential range of the species. No individuals have been documented near the project area.
Townsend's big-eared bat (*Coryhorhinus townsendii*)	SC	Project occurs within the potential range of the species. No individuals have been documented near the project area.
Amphibians and Reptiles		
Columbia spotted frog (*Rana luteiventris*)	SC	The project area occurs within the potential range for the species. However, no impacts on wetlands or springs from the project are anticipated, and no impacts on the species are anticipated.

Group/Species	Status[a]	Notes
western toad (*Bufo boreas*)	SC	The project area occurs within the potential range for the species. However, no impacts on wetlands or springs from the project are expected, and no impacts on the species are anticipated.
sharptail snake (*Contia tenuis*)	SC	The project area occurs within the potential range for the species.
striped whipsnake (*Masticophis taeniatus*)	SC	The project area occurs within the potential range for the species.
Raptors		
bald eagle (*Haliaeetus leucocephalus*)	ST FT	One bald eagle was observed during the winter. No documented breeding records within 2 miles of the project. Bald eagles may rarely fly through the project area, especially in the winter. No impacts on bald eagles are anticipated. Potential reduction of cattle grazing may reduce bald eagle use and risk, due to reduction of carrion.
golden eagle (*Aquila chrysaetos*)	SC	WDFW has historic nesting records within 2 miles of the project area. No active golden eagle nests were observed during raptor nest surveys in 2003. Mean use of the project area was low overall, but highest in the fall (0.143 observations / 30-minute survey) and winter (0.082 observations / 30 minute survey).Two individuals were observed during the in-transit surveys.
peregrine falcon (*Falco peregrinus*)	SS	Potential exists for species to rarely fly through the project area during migration or rarely to forage in breeding season. No peregrine falcons were observed during raptor nest, fixed-point, in-transit count surveys. Active eyries do exist more than 6.5 miles (10.5 km) to the east of the project between the Quilomene Creek and Vantage. No impacts on peregrine falcons are expected.
burrowing owl (*Athene cunicularia*)	SC	One documented burrowing owl breeding area occurs 3–4 miles (5–6 km) southeast of the project area and transmission route. However, no burrowing owls were observed during surveys within the project area, and no impacts on the species are expected.
ferruginous hawk (*Buteo regalis*)	ST	The species is considered a rare migrant and potential breeder within the project area. No ferruginous hawks were observed during fixed-point, in-transit, or raptor nest surveys. No impacts on the species are anticipated.
merlin (*Falco columbarius*)	SC	Two observations of merlins were noted during fixed-point surveys. The species is considered a rare migrant through the project area and is not likely to breed within the project area. No impacts on migrating merlins are expected.
flammulated owl (*Otus flammeolus*)	SC	The project occurs within the potential range of flammulated owls. Suitable habitat exists for the species within patches of conifer within and to the north of the project area. If flammulated owls occur within the project area, a low potential exists for the species to collide with turbines. Only one flammulated owl has been documented as a fatality at wind plants within the US. (Erickson et al. 2001).
northern goshawk (*Accipiter gentiles*)	SC	Two observations of two individuals were made within the project area during the winter of 2002–2003. Overall use of the project area by breeding northern goshawks appears to be relatively low, and no impacts on the species are anticipated.

Group/Species	Status[a]	Notes
Grouse		
sage grouse (*Centrocercus urophasianus*)	ST FC	The project area occurs within a mapped area of historic high use. One documented lek is present approximately 2.75 miles (4.43 km) from the proposed PSE transmission feeder line route. No sage grouse or leks were observed during fixed-point or lek surveys within the project area, although pellets were found incidentally on the south side of Whiskey Dick Mountain in the fall. Although potentially used historically, the project area is not currently occupied by sage grouse leks, and no to very low impacts on the species are anticipated. The project is located within the Colockum Management Unit in the Draft Washington Recovery Plan for sage grouse. This management unit is most important for potential connectivity between the breeding population on the Yakima Training Center and the populations in Douglas County.
sharp-tailed grouse (*Tympanuchus phasianellus*)	ST	The WDFW has one record of a sharp-tailed grouse sighting from 1981 approximately 4–6 miles (6–10 km) from the project area and a transmission feeder line. No sharp-tailed grouse were observed during surveys. It is unlikely that the species occupies the project area and no impacts are expected.
Waterbirds/ Waterfowl		
common loon (*Gavia immer*)	SS	Common loons are considered a rare migrant through the project area. No loons were observed during surveys, and no impacts on the species are anticipated.
western grebe (*Aechmophorus occidentalis*)	SC	Western grebes are considered a rare migrant through the project area. No grebes were observed during surveys, and no impacts on the species are anticipated.
Songbirds		
Lewis' woodpecker (*Melanerpes lewis*)	SC	The project occurs within the potential range of the Lewis' woodpecker. Suitable habitat exists for the species within patches of conifer within and to the north of the project area. However, no Lewis' woodpeckers were observed during surveys, and no impacts on the species are anticipated.
white-headed woodpecker (*Picoides albolarvatus*)	SC	The project occurs within the potential range of the white-headed woodpecker. Suitable habitat exists for the species within patches of conifer within and to the north of the project area. However, no white-headed woodpeckers were observed during surveys, and no impacts on the species are anticipated.
loggerhead shrike (*Lanius ludovicianus*)	SC	Three observations totaling four individuals were observed within the project area during the spring of 2002 and 2003. One observation was made along the PSE transmission route. Overall use of the project area by breeding loggerhead shrikes appears to be relatively low, and low impacts on the species are anticipated.
sage sparrow (*Amphispiza belli*)	SC	Sage sparrows are documented as occurring within sagebrush habitats within and surrounding the project area during fixed-point surveys and by the WDFW. The potential exists for the migrating individuals to collide with turbines. Observations of breeding individuals indicate that the species generally does not fly within the Rotor Swept Area (RSA).

Group/Species	Status[a]	Notes
sage thrasher (*Oreoscoptes montanus*)	SC	Sage thrashers are documented as occurring within sagebrush habitats within and surrounding the project during the fixed and in-transit surveys. The potential exists for the migrating individuals to collide with turbines. Observations of breeding individuals indicate that the species generally does not fly within RSA.
Vaux's swift (*Chaetura vauxi*)	SC	The project area occurs within the potential range of the Vaux's swift. No individuals were observed during fixed-point surveys. The potential exists for migrating individuals to collide with turbines, however, the overall risk to the species is considered low.

FE	Federal Endangered	FT	Federal Threatened	FC	Federal Candidate
FSC	Federal Species of Concern	SE	State Endangered	ST	State Threatened
SC	State Candidate	SS	State Sensitive		

Only one bald eagle was observed during surveys within the project area. The bald eagle was observed during the winter, and no bald eagle nests were observed during raptor nest surveys.

The project area has been used historically by sage grouse (WDFW, PHS Data). Sage grouse have historically been observed in the project area, especially in the fall and winter, with the most recent observations that were entered into the WDFW PHS data occurring in the fall 1997. Portions of the project area are identified as a regular large concentration of sage grouse (WDFW, PHS Data). No leks have been observed near the project area, based on systematic searches, and incidental observations. The nearest known lek is 5 miles (16 km) south of the project area and 2.75 miles (4.4 km) at the closest point to the proposed PSE transmission feeder line. At least one brood was observed in the general vicinity of the project in the early 1990s, suggesting that nesting may have occurred near the project at that time (WDFW PHS). No sage grouse or leks were observed during targeted surveys in March and April 2003 within and surrounding the project area. In addition, no sage grouse were observed during avian use surveys between May 10, 2002 and May 22, 2003. Two sage grouse pellet groups were observed on the south side of Whiskey Dick Mountain during the fall of 2002.

Currently, two populations of sage grouse remain in Washington; one within the Yakima Training Center (YTC) in Yakima and Kittitas counties south of the project area, and one within Douglas and Grant counties to the northeast of the project area. The sage grouse population in 1997 was estimated at approximately 1000 birds, with 600 located in Douglas County and 400 birds in the YTC (Hays et al. 1998).

The project area is located within the western portion of the Colockum sage grouse management unit, as defined in the Draft Washington Sage Grouse Recovery Plan (Stinson et al. 2003). The Colockum management unit is approximately 128,000 acres in size and primarily provides a possible corridor between the sage grouse population within the YTC to the south of the project and the populations to the north and west of the project in Douglas County population. The potential function of the Colockum management unit includes secondary breeding,[2] connectivity,[3] and seasonal use[4] with uncertain but apparently limited potential for reintroduction

[2] Areas that may support limited breeding.
[3] Providing habitat connectivity between breeding areas or seasonal use areas.
[4] Areas likely to be used seasonally during winter, summer, or fall.

and established breeding. Approximately 90% of this management unit is steppe habitat (Table 8 in Stinson et al. 2003). Limiting factors of this unit for providing these functions is the rugged terrain, much of which is unsuitable for sage grouse.

Historic data suggest the potential for sage grouse to use the project area for winter habitat and for potential movement between the YTC and Douglas County populations. It would appear there is currently much less likelihood of consistent use of the project area for nesting, based on no documented birds observed in the project vicinity during the breeding season in the past 10 years, the current nesting habitat quality, and other factors (Stinson et al. 2003). Important components to nest sites and nest success include a large grass and sagebrush canopy cover (Sveum 1995). The grass cover component would appear to be lacking within the project area, due to current grazing practices.

No sage grouse observations (leks or flushed birds) were observed during any of the sage grouse surveys or during other activities.

The Kittitas County Code Title 17A defines "critical areas" as the following:

- wetlands;
- areas with a critical recharging effect on aquifers used for potable water;
- fish and wildlife habitat conservation areas;
- frequently flooded areas; and
- geologically hazardous areas.

Wetlands are addressed in Section 3.4 "Vegetation and Wetlands"; water resources (including aquifers and floodplains) are addressed in Section 3.3 "Water"; and geologically hazardous areas are addressed in Section 3.1 "Earth."

The Kittitas County Code (Title 17A.02.090) further defines "fish and wildlife habitat conservation areas" as follows:

- Lands in Kittitas County owned or leased by the Washington State Department of Fish and Wildlife;
- Lands donated to or purchased by Kittitas County for corridors pursuant to RCW 36.70A.160;
- Wetlands;
- Big game winter range;
- Riparian habitat; and
- Habitats for species of local importance.

Items 1, 4, and 6 are relevant to this section (wetlands and riparian habitat are addressed in Section 3.4 "Vegetation and Wetlands"). Based on the above definitions, the WDFW section within the project area is considered a Kittitas County Critical Area. Big game winter range is also considered a Kittitas County Critical Area; however, by definition, the winter range is limited to areas owned or leased by WDFW (Kittitas County Code 17A.02.040) and therefore consists only of the one section of WDFW-owned land mentioned above within the project area. Coordination for this project has involved contact with numerous federal, state, and local wildlife

specialists and no habitats for species of local importance have been identified other than species and habitats previously addressed.

Project Feeder Lines

Two transmission line routes have been identified as potential options for connecting the project to the existing power grid. One option would require approximately 5 miles of transmission line construction and would connect to an existing Bonneville Power Administration (BPA) transmission line. The other option would require approximately 8 miles of transmission line construction and would connect to an existing Puget Sound Energy (PSE) transmission line. Habitat types within the feeder line corridors are primarily shrub-steppe (91%), with herbaceous, pasture, rock outcrop, and woody riparian habitats making up the remainder.

The BPA route would start in an area identified as both elk and mule deer winter range and as an historic sage grouse high use area within the project site, would then cross the southern boundary of the elk migration corridor discussed above, and would continue through mule deer winter range (WDFW 2003).

The PSE route would be constructed within an area identified as both elk and mule deer winter range within the project site and south to where the route would cross Highway 10 and then would not be within identified priority habitat for the remainder of the route (WDFW 2003).

3.5.1.2 Kittitas Valley Alternative

The Kittitas Valley Alternative is located within the Kittitas Valley approximately 21 miles north-northwest of the WHWPP, and is closer to the east slope of the Cascades than the WHWPP. The Kittitas Valley project area is composed of a series of ridges, primarily trending north-south, with both perennial and ephemeral streams flowing in valley bottoms between them and draining into the Yakima River. Wildlife habitat within this project area is primarily shrub-steppe, with riparian shrub and wetland plant communities occurring in riparian zones of streams and coniferous forest habitat occurring in patches on the site. Shrub-steppe and riparian habitat within the project area have been impacted by cattle grazing, and non-native invasive weed species common.

A total of 97 avian species were identified within the project area. A greater diversity of species were observed during point count surveys for this alternative than during surveys for the WHWPP due to a greater diversity of habitats being present at the Kittitas Valley site. Abundant avian groups documented include passerines (American pipits, American robins, horned larks, western meadowlarks, swifts, swallows, warblers, vireos, chickadees, kinglets, and sparrows), woodpeckers (northern flicker, Lewis' woodpecker, and downy woodpecker), corvids (crows, ravens, and jays), and raptors (American kestrel, bald eagle, golden eagle, turkey vulture, northern goshawk; red-tailed, rough-legged, sharp-shinned, and Cooper's hawks; and great horned owl). Bald eagles, protected under the Endangered Species Act, are documented winter residents in the project vicinity, occurring primarily along the Yakima River, and regularly occur in the project area. The level of use of this Kittitas Valley alternative by bald eagles is greater than that observed in the WHWPP alternative site.

Like the WHWPP, the Kittitas Valley alternative is located within the Pacific flyway however it is located closer to the Cascade mountains and the Yakima River and so may have a higher incidence of use by migratory birds than the WHWPP site.

Mammals observed in the project area included mule deer, elk, and American pika. Other mammals in the project area may include badger, coyote, pocket gopher, bobcat, rabbits, voles, and mice. Reptiles observed within the project area included rubber boa, Great Basin gopher snake, Northern Pacific rattlesnake, and short-horned lizard.

The Kittitas Valley alternative is located within winter range for deer and elk but does not contain any identified regularly used migration corridors for these species.

3.5.1.3 Desert Claim Alternative

The Desert Claim alternative is also located within the Kittitas Valley, in close proximity (1.6 miles east-southeast) of the Kittitas Valley alternative and has similar topography to the Kittitas Valley alternative. Wildlife habitat within this project site is primarily shrub-steppe with grassland, agricultural lands, riparian shrub, riparian and upland forest, and wetland habitat also occurring.

Avian surveys conducted at this site found that passerines were the most abundant group on the site, followed by waterfowl, raptors, and corvids. The most common avian species observed over all seasons were European starling, American robin, mallard and western meadowlark. Bald eagles were observed in the project area. Several species of raptors were also observed, including red-tailed hawk, rough-legged hawk, American kestrel, and northern harrier. Raptor nests were observed in the project area. As described under the KV alternative, wintering bald eagles occur in the vicinity of the Dessert Claim alternative and have been observed within the project area, however foraging and roosting habitat is limited within the project area and most use is concentrated outside of the project area boundary. The level of use of this alternative by bald eagles is greater than that observed in the WHWPP alternative site.

Like the WHWPP, the Desert Claim alternative is located within the Pacific flyway however it is located closer to the Cascade mountains and the Yakima River and so may have a higher incidence of use by migratory birds than the WHWPP site.

Other species observed in the Desert Claim alternative site include short-horned lizard, coyote, porcupine, raccoon, long-tailed weasel, yellow-bellied marmot, least chipmunk, mule deer, and elk. The project area is located within winter range for mule deer. Use by elk appears to be low, however a mapped elk migration corridor crosses the northern portion of the Desert Claim site.

3.5.1.4 Springwood Ranch Alternative

The Springwood Ranch alternative is located directly south-southeast of the Kittitas Valley Site and is situated lower in the valley and extends onto the valley floor. This alternative is lower in elevation that both the WHWPP and the Kittitas Valley alternative and has less extreme topographic relief. Grazed grasslands and agricultural land are the dominant vegetation/wildlife habitat types within the Springwood Ranch site, with alfalfa and hay being the primary crops, and with coniferous forest, deciduous forest, meadow, shrub, and wetland habitats also occurring.

Baseline studies have not been conducted for his site, therefore detailed information on species occurrence comparable to that described for the WHWPP, Kittitas Valley, and Desert claim alternatives is not available. A wide variety of bird species are likely to inhabit the Springwood Ranch site, however. Raptors that have been observed on the site include bald eagles, golden eagles, red-tailed hawks, rough-legged hawks, northern harriers, turkey vultures, American kestrels, owls (most likely short-eared), and falcons. Game bird species that have been observed include ring-necked pheasant, California quail, chukar, gray partridge, mallards, and green-winged teal. Crow, raven, black-billed magpie, meadowlarks, black birds, starlings, house sparrows and great blue herons were also determined to be present.

The Springwood Ranch site is likely host to several species of lizards, snakes, toads, frogs, and salamanders. Short-horned lizards, western skink, and western fence lizards could be found in most habitats on the site, while Northern alligator lizards may be found in the forests or forest openings habitat. Several garter snake species, ringneck snake, rubber boa, gopher snake, yellow-bellied racer, western rattlesnake and possibly sharp-tailed snake may also be found on site based on the habitats present. Amphibians require wetlands or aquatic habitats and would be far more limited than reptiles. Bullfrogs, spotted frog, western toad, Pacific tree frogs, and rough-skinned newts are likely the most common amphibians in the area.

A number of mammal species are likely to use the habitats found on the Springwood Ranch site. The Joe Watt/Robinson subherd of the Yakima elk herd can be found to the south of this area, and some elk activity has been detected along the Yakima River and the John Wayne Trail on the property. A small herd of deer was noted using the bluffs on the south side of the Yakima River, and the flats off the property on the east. Several species of bats are also likely to use the Springwood Ranch site.

3.5.1.5 Swauk Valley Ranch Alternative

The Swauk Valley alternative is located to the north-northwest of and shares a common border with the Springwood Ranch alternative. As described for the Springwood Ranch alternative, baseline studies comparable to those reported for the Desert Claim and Wild Horse sites have not been conducted for the Swauk Valley Ranch site therefore detailed information on species occurrence comparable to that described for the WHWPP, Kittitas Valley, and Desert claim alternatives is not available. In general, animals adapted to open grasslands, or the ecotone between forest and grasslands, would be expected to occur on the Swauk Valley Ranch site. The open, grass-dominated habitats that form the bulk of the south portion site limit its use by forest wildlife. Animals dependent on forest cover are found on the northern portion of the site, in the ponderosa pine and mixed forest.

WDFW identified approximately 220 acres of the northern portion of the site as western bluebird nesting habitat (a WDFW Monitor Species) and oak woodland as Priority Habitat. WDFW also indicated all of the site as mule deer/black-tailed deer habitat and the northern portion as elk habitat (WDFW 2004).

The bald eagle is a relatively abundant winter resident of the Yakima River riparian corridor south and west of the site. Federally listed Species of Concern that could occur in suitable habitats on the site include the tailed frog, Columbia spotted frog, northern goshawk, western burrowing owl, olive-sided flycatcher, loggerhead shrike, Townsend's big eared bat, and five

species of myotis bats. The sage grouse and northern sagebrush lizard may also occur on the site.

Merriam's shrew, ferruginous hawks, flammulated owls, pileated woodpeckers, Lewis' woodpeckers, white-headed woodpeckers, black-backed woodpeckers, striped whipsnake, Vaux's swift, sage thrasher, and sage sparrow could also occur in suitable habitats. Golden eagles possibly occur in small numbers in the area and could potentially nest on cliffs or in trees along the Yakima River.

Nine priority species potentially use suitable habitats on the Swauk Ranch site: sharp-tailed snakes, great blue herons, cavity nesting ducks, osprey, great gray owls, turkey vultures, western bluebirds, big brown bats, pallid bats, and Rocky Mountain mule deer. Western bluebirds and mule deer are known to occur on the northern portion of the site.

3.5.2 Impacts of Proposed Action

Impacts on wildlife species and in particular avian and bat species are expected to occur from the project. Measured use of the site by avian species in addition to mortality estimates from other existing wind plants is used to predict mortality of birds and bats from the project. Post construction monitoring is proposed to validate mortality predictions and monitor the actual level of mortality from the project.

Other impacts include direct loss of habitat due to the project facilities, and indirect impacts such as disturbance and displacement from the wind turbines, roads, and human activities. Both construction (e.g., blasting) and operations impacts are discussed. Potential impacts are discussed for bats, big game, other mammals, reptiles and amphibians, and birds. Discussion of potential impacts on unique species including state and federal listed species is also included.

Potential impacts are divided into those resulting from construction and those resulting from operation of the project. In addition, three different scenarios are analyzed because the number and type of turbines that would be built has not yet been identified, as described in Section 2.2. Table 3.5-4 summarizes the potential impacts on wildlife resulting from construction of the project under each of the possible scenarios, and Table 3.5-5 summarizes the potential impacts on wildlife resulting from operations of the project under each of the possible scenarios. The scenarios are described by the amount of power generated and the number of turbines that would be constricted on the project site. The most likely scenario would be the 136-turbine/1.5-MW scenario; under this scenario turbines would have a rotor length of 70.5 meters. The other scenarios include the 158-turbine/1-MW scenario, which would have a larger number of smaller turbines and a turbine rotor length of 60 meters; and the 104-turbine/3-MW scenario, which would have a smaller number of larger turbines and a turbine rotor length of 90 meters.

Table 3.5-4. Summary of Potential Construction Impacts on Wildlife

	104 Turbines/3 MW	136 Turbines/1.5 MW (Most Likely Scenario)	158 Turbines/1 MW
Birds			
Temporary habitat loss	289 acres	356 acres	401 acres
Permanent habitat loss[1]	164.69 acres	164.74 acres	164.63 acres

	104 Turbines/3 MW	136 Turbines/1.5 MW (Most Likely Scenario)	158 Turbines/1 MW
Big game			
Disturbance	Same as 136-turbine/1.5-MW scenario	Possible avoidance behavior	Same as 136-turbine/1.5-MW scenario
Temporary habitat loss	289 acres	356 acres	401 acres
Permanent habitat loss[1]	164.69 acres	164.74 acres	164.63 acres
Other wildlife	Same as 136-turbine/1.5-MW scenario	Low probability of impacts	Same as 136-turbine/1.5-MW scenario
Unique Species			
Bald eagle	Same as 136-turbine/ 1.5-MW scenario	Temporary disturbance	Same as 136-turbine/1.5-MW scenario
Golden eagle	Same as 136-turbine/1.5-MW scenario	Temporary disturbance	Same as 136-turbine/1.5-MW scenario
Sage sparrow and sage thrasher			
Temporary habitat loss	289 acres	356 acres	401 acres
Permanent habitat loss[1]	164.69 acres	164.74 acres	164.63 acres
Peregrine falcon	None	None	None
Burrowing owl	None	None	None
Small mammals	Same as 136-turbine/1.5-MW scenario	Temporary disturbance	Same as 136-turbine/1.5-MW scenario
Amphibians	None	None	None

Information about bird fatalities at other wind projects suggests that a wide variety of species and groups are susceptible to collision with turbines. Some evidence also suggests that peak mortality may occur during migration periods although some mortality has been documented throughout all seasons (see Erickson et al. 2000, Young et al. 2003, Johnson et al. 2002, Erickson et al. 2003a, and Erickson et al. 2003b).

Potential impacts on birds using the study area include fatalities from collision with wind turbines or from construction equipment, loss of habitat, disturbance to foraging and breeding behavior, collision with overhead power lines, and electrocution. Project-related human activity could alter bird behavior and cause displacement during the construction phase of the project, and the postconstruction density of turbines and facilities on the developed portion of the site may alter avian use.

The WDFW has expressed concern over the potential effects of wind project development and operation on wintering big game. Winter is a crucial period of time for the survival of many big game species. Deer, for example, cannot maintain body condition during the winter because of

reduced forage availability combined with the increased costs of thermogenesis (Reeve and Lindzey 1991). In other words, as deer expend more energy than they take in, body condition gradually declines throughout the winter (Short 1981). Unnecessary energy expenditures may increase the rate at which body condition declines, and the energy balance determining whether a deer will survive the winter is thought to be relatively narrow, especially for fawns (Wood 1988). Overwinter fawn survival may decrease in response to human activity or other disturbances (Stephenson et al. 1996). Roads and energy development may also fragment otherwise continuous patches of suitable habitat, effectively decreasing the amount of winter range available for big game. Fragmentation of habitat may also limit the ability of big game populations to move throughout the winter range as conditions change, causing big game to utilize less suitable habitat (Brown 1992).

Bald eagle is the only federally listed species documented on the project site. Only one bald eagle was observed in the project site during the year-long survey effort and occurrence of bald eagles in the project site is expected to be rare.

The potential ranges of several other special status species recognized under Washington Administrative Code 232-12-297 overlap with the project, including one species listed as threatened (ferruginous hawk), one species listed as sensitive (common loon) and several candidate species: flammulated owl, merlin, northern goshawk, sharp-tailed grouse, western grebe, Lewis' woodpecker, white-headed woodpecker, and Vaux's swift (Table 3.5-3). The potential exists for these species to occur within the project area; however, use of the project area by these species is expected to occur very rarely during migration or dispersal events. The potential exists for a few individuals of each species to collide with turbines over the life of the project; however, no population impacts on these species are anticipated under any of the scenarios.

The project area occurs within the potential range of the striped whipsnake, sharptail snake, western toad and Columbia spotted frog. There is very little suitable habitat for amphibians or aquatic reptiles (e.g., turtles) in the study area. None of these sensitive status reptiles or amphibians was documented on the project site and no impacts are anticipated under any of the scenarios.

3.5.2.1 Construction Impacts

Birds

Project construction may affect birds through loss of habitat, potential fatalities from construction equipment, and disturbance/displacement effects from construction and human occupation of the area. Vegetation type/habitat losses from the project are addressed in Section 3.4 "Vegetation and Wetlands." Potential mortality from construction equipment on site is expected to be quite low. Equipment used in wind plant construction generally moves at slow rates (e.g., cranes) or is stationary for long periods. The risk of mortality from construction to avian species is most likely limited to potential destruction of a nest with eggs or young for ground- and shrub-nesting species when equipment initially disturbs the habitat. Disturbance type impacts can be expected to occur if construction activity occurs near an active nest or primary foraging area. Birds displaced from these areas may move to areas with less disturbance; breeding effort may be affected and foraging opportunities altered during the period

of the construction. However, construction is expected to be completed in under a year and therefore would impact only one nesting season. The project construction schedule is shown in Table 2.3. Proposed construction of roads and tower foundations is planned for the spring through the fall and will have some effect on nesting birds and their young. No disturbance or displacement impacts on raptor nests are anticipated, since no active raptor nests were identified within 0.5 mile (0.80 km) of project facilities.

Temporary habitat loss would vary by scenario, with the 355.97 acres impacted under the 136-turbine/1.5-MW scenario, 401.42 acres impacted under the 158-turbine/1-MW scenario, and 289.45 acres impacted under the 104-turbine/3-MW scenario. Permanent habitat impacts would be similar under all scenarios, with differences of less than an acre between them. Permanent habitat loss would be 164.74 acres under the 136-turbine/1.5-MW scenario, 164.63 acres under the 158-turbine/1-MW scenario, and 164.69 acres under the 104-turbine/3-MW scenario.

Big Game

During the construction period, it is expected that elk and mule deer will be temporarily displaced from the site due to the influx of humans and heavy construction equipment and associated disturbance (e.g., noise, blasting). All heavy construction, including road and foundation construction and blasting, will occur between April 15 and November 15, outside the critical winter periods. Construction activities in the winter will include only survey and design activities, which may have some minor displacement impacts on big game and elk. These activities in the winter would likely have a very minor reduction in the quantity and quality of big game winter range. The Quilomene elk winter range is approximately 83,000 acres in size and the Quilomene deer winter range is approximately 40,000 acres in size. The project area is located south east of the Quilomene elk migratory corridor. During winter construction activities, elk moving to winter range east of the project may avoid areas of human disturbances locally within the project, but overall increases in distances needed to travel would be insignificant. Following completion of the project, the disturbance levels from construction equipment and humans will diminish dramatically and the primary disturbances will be associated with operations and maintenance personnel, occasionally vehicular traffic, and the presence of the turbines and other facilities. Since the construction effort would be similar for all scenarios, impacts on big game would be expected to be similar for all scenarios.

Other Wildlife

Impacts on bats or bat habitat on the site are unlikely during construction. Construction of the project may affect other mammals that are likely to exist within the project site including badger, coyote, pocket gopher, Paiute ground squirrels, and other small mammals such as rabbits, voles, and mice through loss of habitat and direct mortality of individuals occurring in construction zones. Excavation for turbine pads, roads, or other wind project facilities could kill individuals in underground burrows. Road and facility construction will result in loss of foraging and breeding habitat for small mammals. Habitat for ground-dwelling mammals would be removed in areas where permanent impacts would occur; however, these species are expected to repopulate the temporarily impacted areas.

Impacts on reptiles and amphibians on the project site may occur through loss of habitat and direct mortality of individuals occurring in construction zones. No wetlands will be impacted by

the project, so habitat loss for amphibians would be minimal. Because best management practices will be employed on site and compliance with applicable permits regarding runoff and sediment control will be maintained, impacts on amphibians are not expected to occur in association with construction or operation of the project.

The level of mortality to reptiles on site associated with construction would be based on the abundance of species on site. Some mortality may be expected as common reptiles that may occur on site, such as short-horned lizards and yellow-bellied racers, often retreat to burrows underground for cover or during periods of winter dormancy. Excavation for turbine pads, roads, or other project facilities could kill individuals in underground burrows. While above ground, yellow bellied racers and other snakes are likely mobile enough to escape construction equipment; however, short-horned lizards do not move fast over long distances and rely heavily on camouflage for predator avoidance. Some individual lizard fatalities can be expected from vehicle activity.

Unique Species

Threatened and Endangered Species

Potential impacts on bald eagles during project construction would be temporary disturbance with the possibility of mortality considered negligible and extremely unlikely to occur. Bald eagle use is expected to be limited to occasional use in the winter and early spring and heavy construction activities would not occur during this time. If a bald eagle were to fly through the area during the construction period, it is unlikely to occur within the construction zones due to disturbances and therefore unlikely to be at risk of construction-related mortality. Since construction activities would be similar under all scenarios, potential impacts on bald eagles would be similar also.

Other Special Status Species

Golden Eagle

Potential impacts on golden eagles from project construction would be limited to disturbance impacts, causing them to avoid the area. The existing level of use is low, however, so disturbance impacts would be infrequent. No disturbance impacts on golden eagle nests from construction activities are anticipated since no active nests were documented within 2 miles of the project area. During project construction the possibility of mortality effects to golden eagles is considered very unlikely to occur. Construction impacts on golden eagles would be similar under all scenarios.

Sage Sparrow and Sage Thrasher

Sage sparrows and sage thrashers breed within sagebrush and shrub habitats in the project area. During project construction there is some likelihood of mortality of sage sparrows and sage thrashers from collision with construction equipment. Proposed construction of roads and tower foundations are planned for spring through fall, and could therefore have some effect on nesting birds and their young. Construction tasks such as wind turbine assembly and erection may occur during the nesting period for songbirds and raptors, and may disturb or otherwise impact nesting activity. Construction impacts would be expected to be similar under all scenarios.

Sage Grouse

There is very limited information on the potential disturbance and displacement impacts of wind projects on sage grouse. Presence of young broods at the Foote Creek Rim wind project in Wyoming suggest nesting has likely occurred somewhere near a wind project, although the exact nesting location relative to wind turbines is not known (D. Young, WEST, Inc., pers. comm.). Studies of prairie chickens suggest they avoid suitable habitat within 0.5 mile of residences, well-traveled roads, and compressor stations, and did not nest in suitable habitat near a coal-fired generation station (Robel 2002). Sage grouse nested farther from leks in areas classified as disturbed compared to less disturbed areas in Wyoming (Lyons 2001).

The project area is located on the western edge of the proposed sage grouse management area. It would appear the project would not significantly impact connectivity between Douglas County populations and the Yakima and Kittitas County populations, given that the shrub-steppe habitats (Whiskey Dick and Quilomene Wildlife Areas and private lands between the two Wildlife areas) to the east of the project would remain intact. In addition, while turbine strings are linear features, they are highly permeable to wildlife movement because of the separation between turbines. Approximately 100 acres of shrub-steppe habitat will be permanently impacted by the footprint of the project out of more than 8,600 acres of shrub-steppe habitat within the project area. The 8,600 acres is approximately 7% of the 128,000 acre Colochum management area. The loss of 100 acres of this unit represents a loss of less than 0.08%. Impacts are expected to be similar under all scenarios.

Peregrine Falcon

The nearest known peregrine eyrie is located approximately 6.5 miles (10.5 km) from the project area. No peregrine falcon eyries were located during raptor nest surveys. Cliff habitat is present within 2 miles of the project area, and the potential exists for peregrine falcons to nest within these cliff habitats. However, most suitable peregrine falcon nesting habitat is located along the Columbia River, and it is unlikely that peregrine falcons will nest within 2 miles of the project area. Use of the project area by peregrine falcons is likely limited to rare dispersal events or occasional individuals migrating or hunting within the project area. No construction impacts are expected under any of the scenarios.

Burrowing Owl

Although no burrowing owls have been documented within the project area during surveys, burrowing owl breeding areas have been designated by the WDFW 3–4 miles (5–6 km) southeast of the project area. The potential exists for breeding burrowing owls to occur within the project area. However, considering the lack of sightings within the project area, burrowing owls likely occur only occasionally within the project area, and no construction impacts on burrowing owls are expected.

Other Bird Species

Additional species not discussed above (Federal or State Threatened, Endangered or Candidate) are American kestrel, Brewer's blackbird, Brewer's sparrow, horned lark, loggerhead shrike, western meadowlark, mourning dove, and killdeer. Many of these species are very common and widely distributed (e.g., western meadowlark, horned lark, American kestrel), but nevertheless

have shown apparent declines in abundance in shrub-steppe habitats from BBS data (Sauer 1999).

As proposed, construction of roads and tower foundations is planned for the spring through the fall, and will have some effect on nesting birds and their young. The risk of mortality from construction to avian species is most likely limited to potential destruction of a nest with eggs or young for ground- and shrub-nesting species when equipment initially disturbs the habitat. Disturbance type impacts can be expected to occur if construction activity occurs near an active nest or primary foraging area. Birds displaced from these areas may move to areas with less disturbance; however, breeding efforts may be affected and foraging opportunities altered during the period of the construction (under one year). Temporary habitat impacts would be least under the 104-turbine/3-MW scenario and greatest under the 158-turbine/1-MW scenario. Permanent impacts would be similar under all scenarios.

Mammals

The project occurs within the potential range of several species of federally and state protected mammals, which are unlikely to occur within the project area due to habitat constraints and/or uncertain population status in Washington. These species include Townsend's big-eared bat, long-legged myotis, and long-eared myotis. These species are not expected to occur within the project area and no impacts on these species are likely to occur under any of the scenarios.

Both white-tailed and black-tailed jackrabbits have been documented in the project area. The potential exists for individuals to be killed by vehicles on roads or by construction equipment. This will be minimized by enforcing speed limits within the project site. Suitable habitat for these species (shrub-steppe) will be lost to turbine pads and road construction; however, only a relatively small portion of the total amount of existing habitat would be impacted, and this is not expected to alter use of the site by these species. Temporary habitat impacts would be least under the 104-turbine/3-MW scenario and greatest under the 158-turbine/1-MW scenario. Permanent impacts would be similar under all scenarios.

Merriam's shrew has been documented within Kittitas County, and suitable habitat for the species occurs within the project area. The potential also exists for the brush prairie pocket gopher to occur within the project area. Assuming that these species are present within the project area, the construction of turbine pads and roads, as well as vehicle traffic, have the potential to crush individuals within burrows or moving above ground. Overall, the amount of habitat that would be removed would be a small portion of the total available for these species, and although impacts on individuals may occur, populations of these species would be expected to continue to occupy the project site. Impacts would be similar under all scenarios.

Project Feeder Lines

Potential impacts from construction of project feeder lines include both temporary and permanent impacts on wildlife habitat, potential disturbance, and risk of mortality from collision with transmission lines and electrocution. No wildlife surveys have been conducted specifically for the feeder line alignments.

Habitats within the feeder lines is primarily shrub-steppe. Construction of either the PSE or BPA route would result in a permanent habitat loss of less than 0.5 acre, while there would be a

temporary loss of 28 acres on the BPA route and 18 acres on the PSE route. This would impact nesting habitat for birds associated with shrub-steppe habitat, grazing/browsing habitat for big game, and foraging and cover habitat for small mammals. Since the majority of the habitat impacts would be temporary, it is expected that it would alter suitability of the area for these species for only a short time and then use would return to preconstruction levels following completion of construction activities.

Noise and activity associated with construction is also likely to cause temporary displacement of wildlife species in the feeder line areas.

Mortality of small mammals and ground nesting birds may result from use of heavy equipment during project construction.

3.5.2.2 Operations and Maintenance Impacts

Birds

Operations-Related Mortality

Bird fatality projections of 0.6 to 3.5 per turbine year are anticipated, based on the results of completed studies conducted at the Vansycle wind project in Umatilla County, Oregon (Erickson et al. 2000), the Foote Creek Rim Phase I wind project in Carbon County, Wyoming (Young et al. 2003), the Klondike Wind Project in Sherman County, Oregon (Johnson et al. 2003a), the Buffalo Ridge wind project in southwestern Minnesota (Johnson et al. 2002), the Stateline Wind Project in Umatilla County, Oregon and Walla Walla County, Washington (Erickson et al. 2003a), and the Nine Canyon Wind Project in Benton County, Washington (Erickson et al. 2003b). Most of the fatalities will likely involve resident songbirds such as horned lark, vesper sparrow, western meadowlark, and other common species. Some upland game bird fatalities are anticipated. Occasional nocturnal migrating songbird fatalities are also anticipated, but the risk of large mortality events would appear to be very low (Erickson et al. 2001). Waterfowl and other waterbird (e.g., gulls) mortality are estimated to be low, given the low use of the project area by these groups. Low raptor mortality is anticipated (see Table 3.5.5 below).

Table 3.5-5. Summary of Potential Operations, Maintenance and Decommissioning Impacts on Wildlife

Operations and Maintenance Impacts	104 Turbines/3 MW	136 Turbines/1.5 MW (Most Likely Scenario)	158 Turbines/1MW
Birds - mortality			
Raptors	Less than 136-turbine/1.5-MW scenario	1 to 10 per year	More than 136-turbine/1.5-MW scenario
Passerines	Less than 136-turbine/1.5-MW scenario	50 to 300 per year	More than 136-turbine/1.5-MW scenario
Waterfowl	Same as 136-turbine/1.5-MW scenario	Low probability of mortality	Same as 136-turbine/1.5-MW scenario
Birds - disturbance	Same as 136-turbine/1.5-MW scenario	Potential for disturbance	Same as 136-turbine/1.5-MW

Operations and Maintenance Impacts	104 Turbines/3 MW	136 Turbines/1.5 MW (Most Likely Scenario)	158 Turbines/1MW
	MW scenario		scenario
Big game	Same as 136-turbine/1.5-MW scenario	Potential avoidance behavior	Same as 136-turbine/1.5-MW scenario
Other wildlife			
Bats	Less than 136-turbine/1.5-MW scenario	Potential for mortality, numbers unknown.	More than 136-turbine/1.5-MW scenario
Small mammals	Same as 136-turbine/1.5-MW scenario	Potential for mortality, numbers unknown	Same as 136-turbine/1.5-MW scenario
Amphibians	Same as 136-turbine/1.5-MW scenario	No impacts expected	Same as 136-turbine/1.5-MW scenario
Unique Species			
Bald eagle	Same as 136-turbine/1.5-MW scenario	Low probability of mortality	Same as 136-turbine/1.5-MW scenario
Golden eagle	Less than 136-turbine/1.5-MW scenario	Potential for mortality	More than 136-turbine/1.5-MW scenario
Sage sparrow and sage thrasher	Less than 136-turbine/1.5-MW scenario	Potential for mortality	More than 136 Turbines/1.5-MW scenario
Sage Grouse	Same as 136 Turbines/1.5-MW scenario	Potential for disturbance	Same as 136 Turbines/1.5-MW scenario
Peregrine falcon	Same as 136-turbine/1.5-MW scenario	Low probability of mortality	Same as 136-turbine/1.5-MW scenario
Burrowing owl	None	None	None
Small mammals	Same as 136-turbine/1.5-MW scenario	Potential for mortality	Same as 136-turbine/1.5-MW scenario
Amphibians	None	None	None

Due to the relatively recent commercial introduction of wind turbines with rotor diameters greater than 70 meters, there is very little information comparing avian and bat fatality rates of 90-meter rotor diameter (RD) turbines to 60-meter RD turbines. New generation wind projects where standardized mortality studies have been conducted in the West and Midwest include turbines ranging from 30 to 70 meter RD (Erickson et al. 2001, Erickson et al. 2003a, Erickson et al. 2003b, Johnson et al. 2003a). Some characteristics of the larger turbines may lead to fewer raptor, resident passerine, and other diurnal bird, fatalities because of the lower RPMs

(revolutions per minute) of the turbine blades and the higher tip clearance (above the ground). The tip clearance for the 90-meter RD turbine on an 80-meter tower is 35 meters, while the tip clearance for the 60-meter RD turbine on a 60-meter tower is 30 meters. Most of the daytime passerine flight heights observed at this and other projects are below 35 meters (Johnson et al. 2000a, Johnson et al. 2000b, Erickson et al. 2003c, and Young et al. 2003a).

Models developed by Tucker (1996a, 1996b) suggest a lower theoretical collision risk per MW of nameplate capacity as the length of the rotors of the turbines increase and the RPMs decrease. Earlier work by Howell (1997) suggested lower raptor collision risk with 33-meter RD turbines compared to 18-meter RD turbines in California. Nocturnal migrating songbirds, which fly at higher altitudes, may be more at risk to collision with taller, larger RD turbines compared to shorter, smaller RD turbines. For the purposes of the mortality estimates discussed in this EIS and to incorporate uncertainty into the predictions, the Applicant's biologists used the range of mortality observed (instead of average) during all studies in the West and Midwest (based on turbines ranging from 30-meter rotor diameter to 70-meter rotor diameter).

Raptors

Raptor use at the project is estimated to be similar or lower compared to other wind projects with similar turbine types. Data were recorded in the field to allow standardization to 10-, 20-, and 30-minute survey duration, to allow comparison to survey data from other wind projects. As a group, raptor use ranged from 0.122 per 20-minute survey in the winter to 0.41 and 0.35 per 20-minute survey in the spring and fall, respectively. Raptor use at the Vansycle wind project in Oregon and the Buffalo Ridge wind project in Minnesota is estimated similar to the Wild Horse Wind Power Project (0.36 and 0.49 raptor per 20-minute survey, respectively). Raptor use at the Foote Creek Rim wind project was approximately 0.73 raptor per 20-minute survey.

Raptor mortality at new generation wind projects has been low. The estimate of raptor mortality at the Foote Creek Rim wind project in Wyoming, which is located in native grassland and shrub-steppe habitat, was estimated at 0.03 raptor per turbine per year based on a three-year study of 69 turbines (Young et al. 2002). No raptor mortality was observed at the Vansycle wind project in Oregon during a one-year study (Erickson et al. 2000); and one raptor fatality was recorded over a four-year study at the Buffalo Ridge wind project (Johnson et al. 2002). No raptor fatalities were observed at the 16-turbine Klondike wind project in Sherman County, Oregon (Johnson et al. 2003a), and one American kestrel fatality has been observed at the Ponnequin Wind Project in Weld County, Colorado (Kerlinger pers. comm.). Raptor mortality estimates from the Stateline Wind Project (Erickson et al. 2003a) and the Nine Canyon Wind Project (Erickson et al. 2003b) have ranged from 0.05 to 0.07 raptor fatality per turbine per year, with most fatalities consisting of red-tailed hawks and American kestrels. Completed studies at other small wind projects have not documented any raptor fatalities (Erickson et al. 2001).

Considering these mortality results as well as raptor use estimates at these wind projects, it is estimated that potential raptor mortality at the project will be within the range of raptor mortality observed at other wind projects in the West and Midwest. Approximately 1 to 10 raptor fatalities per year are expected at the project if 136 turbines are constructed (the most likely scenario). It should be noted that the fatality estimates may vary from the expected range based on many factors, including the number of occupied raptor nests near the wind project after construction, turbine size, and other site specific and/or weather variables.

American kestrels and red-tailed hawks account for much of the diurnal raptor use at the site, and are expected to be the two species of raptors with the highest fatality rates over the life of the project. Species with low risk of collisions include northern harrier, golden eagle, rough-legged hawk, great horned owl, Swainson's hawk, northern goshawk, bald eagle, Cooper's hawk and sharp-shinned hawk. Turkey vultures appear less susceptible to collision that most other raptors (Orloff and Flannery 1992). Very few northern harrier, Cooper's hawk, and sharp-shinned hawk fatalities, and no rough-legged hawk or bald eagle fatalities have been documented at wind projects to date. Golden eagle use of the site is low relative to other wind sites and the mortality risk for golden eagles is also expected to be very low.

As described above, bigger turbines having a lower RPM and higher ground clearance may result in lower raptor mortality rates. Therefore; raptor mortality rates may potentially be highest under the 158-turbine/1-MW scenario and lowest under the 104-turbine/3-MW scenario, with the 136-turbine/1.5-MW scenario somewhere between.

Passerines

Passerines have been the most abundant avian fatality at other wind projects studied (see Johnson et al. 2002; Young et al. 2002; Erickson et al. 2000, Erickson et al. 2001), often comprising more than 80% of the avian fatalities. Both migrant and resident passerine fatalities have been observed. Given that passerines make up the vast majority of the avian observations at the project site, it is expected that passerines will make up the largest proportion of fatalities. Species most common to the study area will likely be most at risk, including western meadowlark, vesper sparrow, and horned lark. Horned larks have been the most commonly observed fatality at several wind projects, including Vansycle, Foote Creek Rim, Stateline, and Nine Canyon (Erickson et al. 2000, Young et al. 2002, Erickson et al. 2003a, Erickson et al. 2003b). A few large flocks of birds such as snow buntings were observed, but given their infrequent use, mortality would be expected to be low. Some fatalities of nocturnal migrating songbird are expected. However, no large events have been documented at wind projects. Only two small events have been reported. At Buffalo Ridge in Minnesota, 14 migrating passerine fatalities (vireos, warblers, flycatchers) were found at two turbines during a single night in May 2002 (Johnson et al. 2002). Approximately 25 to 30 migrating passerine fatalities (mostly warblers) were observed near three turbines and a well-lit substation at the Mountaineer wind project in West Virginia. Based on the mortality estimates from the other wind projects studied, between 50 and 300 passerine fatalities may occur per year at the project if 136 turbines are constructed.

Carcass search studies at the Foote Creek Rim Wind Plant, Wyoming, have found avian casualties associated with guyed met towers. Based on searches of five permanent met towers at Foote Creek Rim over a three-year period, it was estimated that these towers resulted in approximately 8.1 avian casualties per tower per year (Young et al. 2002). The vast majority of these avian casualties were passerines. The nine permanent met towers proposed for the project would be expected to result in collision deaths for passerines at the site, although the use of bird flight diverters on guy wires should reduce the risk of collision.

As described above, bigger turbines having a lower RPM and higher ground clearance may result in lower mortality rates for resident passerines and other diurnal birds, therefore mortality rates for these species may potentially be highest under the 158-turbine/1-MW scenario and lowest under the 104-turbine/3-MW scenario, with the 136-turbine/1.5-MW scenario somewhere

between. The opposite may be true for nocturnal migrating songbirds, however, for which the 104-turbine/3-MW scenario may have the highest the mortality, the 158-turbine/1-MW scenario the least mortality, and the 136-turbine/1.5-MW scenario in between.

Waterfowl

Some waterfowl mortality has been documented at other wind plants (Erickson et al. 2001, Johnson et al. 2002 and 2003a, Kerlinger pers. comm., Erickson et al. 2003). However, studies at Foote Creek Rim, Vansycle, and Buffalo Ridge have not documented mortality of Canada geese, the only waterfowl species observed flying over the project area. Two Canada geese fatalities were recorded at the Klondike project, in an area where relatively high use has been documented (Johnson et al. 2003a), and one Canada goose fatality has been documented at the Stateline Wind Project (Erickson et al. 2003). Because of the low use of the site by waterfowl, little waterfowl mortality would be expected from the project and would be similar for all scenarios.

Other Avian Groups/Species

Some upland game bird mortality has been documented at wind projects (Erickson et al. 2001, Erickson et al. 2003). Based on habitat and use, there is potential for mortality of some upland game birds such as chukars and gray partridge. Game bird mortality would be expected to be less with larger turbines having higher tip clearance, therefore lowest under the 104-turbine/3-MW scenario and highest for the scenario with the smaller turbines (158-turbine/1 MW), with the 136-turbine/1.5-MW scenario in between. Other avian groups (e.g., doves, shorebirds) occur in relatively low numbers within the study area and mortality would be expected to be very low and similar for all scenarios.

Operations-Related Disturbance

Most studies of disturbance or displacement effects have been conducted in Europe, and most of the impacts have involved wetland habitats and groups of birds not common on this project, including waterfowl, shorebirds, and waders (Larsen and Madsen 2000, Pederson and Poulsen 1991, Vauk 1990, Winkelman 1989, Winkelman 1990, and Winkelman 1992). Most disturbance has involved feeding, resting, and migrating birds in these groups (Crockford 1992). European studies of disturbance to breeding birds suggest negligible impacts and disturbance effects were documented during only one study (Pedersen and Poulsen 1991). For most avian groups or species or at other European wind plants, no displacement effects on breeding birds were observed (Karlsson 1983, Phillips 1994, Winkelman 1989, and Winkelman 1990).

Avian disturbance or displacement associated with wind power development has not received as much attention in the US. At a large wind project on Buffalo Ridge, Minnesota, abundance of shorebirds, waterfowl, upland game birds, woodpeckers, and several groups of passerines was found to be significantly lower at survey plots with turbines than at plots without turbines. There were fewer differences in avian use as a function of distance from turbines, however, suggesting that the area of reduced use was limited primarily to those areas within 328 feet (100 meters) of the turbines (Johnson et al. 2000a). A sizeable portion of these effects are likely due to the direct loss of habitat near the turbine for the turbine pad and associated roads. These results are similar to those of Osborn et al. (1998), who reported that birds at Buffalo Ridge avoided flying in areas with turbines. Also at Buffalo Ridge, Leddy et al. (1999) found that densities of male songbirds

were significantly lower in Conservation Reserve Program (CRP) grasslands containing turbines than in CRP grasslands without turbines. Grasslands without turbines as well as portions of grasslands located at least 591 feet (180 meters) from turbines had bird densities four times greater than grasslands located near turbines. Reduced avian use near turbines was attributed to avoidance of turbine noise and maintenance activities and reduced habitat effectiveness due to the presence of access roads and large gravel pads surrounding turbines (Leddy 1996; Johnson et al. 2000a).

Construction and operation of the Foote Creek Rim wind plant did not appear to cause reduced use of the wind plant and adjacent areas by most avian groups, including raptors, corvids, or passerines (Johnson et al. 2000b). Some reduced use of the areas near turbines was apparent for a local population of mountain plovers, although a regional downward trend was also observed during the same time period (Young 2003 pers. comm.). A pair of golden eagles successfully nested 0.5 mile (0.80 km) from the wind plant after one phase was operational and another phase was under construction.

If disturbance is limited to occurring within a particular distance of turbines, an assumption can be made that the fewer turbines constructed the less areas disturbed. Based on this assumption, the 104-turbine/3-MW scenario would cause the least amount of disturbance to birds, the 158-turbine/1-MW scenario would cause the most, with the 136-turbine/1.5-MW scenario in between.

Development of wind turbines near raptor nests may result in indirect and direct impacts on the nesting birds. However, the only report of avoidance of wind plants by raptors occurred at Buffalo Ridge, where raptor nest density on 261 km^2 of land surrounding a wind plant was 5.94/100 km^2, yet no nests were present in the 32 km^2 wind plant facility itself, even though habitat was similar (Usgaard et al. 1997). The difference between observed (0 nests) and expected (2 nests) is not statistically significant. Similar numbers of raptor nests were found before and after construction of Phase 1 of the Montezuma Hills, California wind plant (Howell and Noone 1992). A pair of golden eagles successfully nested 0.8 km from the Foote Creek Rim, Wyoming wind plant for three different years after it became operational (Johnson et al. 2000b), and a Swainson's hawk nested within 0.8 km of a small wind plant in Oregon (Johnson et al. 2003a). Anecdotal evidence indicates that raptor use of the Altamont Pass, California wind resource area (WRA) may have increased since installation of wind turbines (Orloff and Flannery 1992, American Wind Energy Association 1995).

Operation of the project would not affect raptor nests unless there were disturbance or displacement effects that caused raptors to not return to the nests close to the project site. Such impacts are expected to be low since no active raptor nests were identified within 0.5 mile (0.80 km) of proposed turbine sites, and since there is very little raptor nesting habitat near the project site. Impacts on nesting raptors would be expected to be similar for all scenarios.

Based on the available information, it is probable that some disturbance or displacement effects may occur to the grassland/shrub-steppe avian species occupying the study area. The extent of these effects and their significance is unknown and hard to predict but could range from none to several hundred feet.

Big Game

A few published studies of big game winter use may be relevant to the development of wind turbines and wintering deer and elk (Rost and Bailey 1979, Brakken and Musser 1993, Van Dyke and Klein 1996, Johnson et al. 2000c, and Wisdom et al. 2002). Van Dyke and Klein (1996) documented elk movements through the use of radio telemetry before, during, and after the installation of a single oil well within an area used year round by elk. Drilling activities during their study ceased by November 15; however, maintenance activities continued throughout the year.

Elk showed no shifts in home range between the pre- and postdrilling periods, however, elk shifted core use areas out of view from the drill pad during the drilling and postdrilling periods. Elk also increased the intensity of use in core areas after drilling and slightly reduced the total amount of range used. It was not clear if avoidance of the well site during the post-drilling period was related to maintenance activities or to the use of a new road by hunters and recreationalists. The authors concluded that if drilling activities occupy a relatively small amount of elk home ranges, that elk are able to compensate by shifting areas of use within home ranges.

WDFW conducted a radio telemetry study of the Colockum Elk herd between July 1987 and June 1992 (Brakken and Musser 1993). Elk showed some selection for areas close to roads, but these results are suspect because of incomplete road GIS coverage, and absence of traffic counts associated with the roads. In addition, elk also showed selection of habitat close to water sources, and distance to water sources and distance to roads were positively correlated, suggesting a confounding between the effect of water and roads. These positive relationships between elk selection and distance to roads occurred in spring, summer and fall, while in winter, no relationship between selection and distance to roads was observed.

Studies have been conducted at the Starkey Research Unit, a large fenced experimental study area near La Grande in northeast Oregon, using radio-collared elk and deer. Results of spring studies (April–early June) suggest that elk habitat selection may be negatively related to traffic and other human disturbance (Johnson et al. 2000c). Elk also tended to increase movement distances as a function of increased use by humans, including ATV use, hiking, and horseback riding (Wisdom et al. 2002). Mule deer habitat selection, on the other hand, appears to primarily be related to elk distribution, with mule deer avoiding areas used by elk. Traffic and roads did not appear to be an important factor in spring distribution of mule deer. In fact, there was some selection for areas close to roads with medium levels of traffic, but the cause of this relationship is unknown. Mule deer showed some increase in movement distances as a function of increased use by humans, including ATV use, hiking and horseback riding (Wisdom et al. 2002), but much less response than elk showed. Rost and Bailey (1979) found that wintering mule deer and elk avoided areas within 656 feet (200 meters) of roads in eastern portions of their Colorado study area, where presumably greater amounts of winter habitat were present. Road avoidance was greater where roads were more traveled. Only mule deer showed a clear avoidance of roads in the western portion of their study area, where winter range was assumed to be more limiting. Mule deer also showed greater avoidance of roads in shrub habitats versus more forested areas. The authors concluded that impacts of roads depended on the availability of suitable winter range away from roads, as well as the amount of traffic associated with roads.

There is little information regarding the specific effects of wind projects on big game. At the Foote Creek Rim wind project in Wyoming, pronghorn observed during raptor use surveys were recorded year round (Johnson et al. 2000b). The mean number of pronghorn observed at the six survey points was 1.07 prior to construction of the wind plant and 1.59 and 1.14/survey the two years immediately following construction, indicating no reduction in use of the immediate area. Mule deer and elk also occurred at Foote Creek Rim, but their numbers were so low that meaningful data on wind plant avoidance could not be collected.

Due to the lack of knowledge regarding the potential impacts of energy development on big game, it is difficult to predict with certainty the effects of the project on mule deer and elk. Van Dyke and Klein (1996) showed that wintering elk shifted use of core areas out of view of human-related activities associated with an oil well and access road. Most turbines and roads in the project area will be located on ridges and will be visible over a fairly large area. While human-related activity at wind turbines during regular maintenance will be relatively infrequent, it is not known if human activity associated with regular maintenance activity will exceed tolerance thresholds for wintering elk. If tolerance thresholds during regular maintenance activities were exceeded, elk would likely permanently utilize areas away from the wind development. The project area proposed for development has historically received regular use throughout the year by hunters and other recreationalists including motorcycle and ATV riders, campers, birders, and hikers. Access during construction and operation of the project will be controlled by the Applicant, and disturbance during operation to big game may be minimized and actually less than that which occurred predevelopment.

WDFW has also expressed concern regarding the potential for wind projects to increase elk and mule deer damage claims on private agricultural lands near wind projects. Elk and mule deer, if displaced from the project area, may increase their utilization of agricultural lands in the vicinity of the project area. If elk and mule deer are not displaced from the project, then WDFW is concerned that the project may create a "sanctuary" if hunting is not allowed in the project area, therefore limiting WDFW's ability to manage the herds. The Applicant has agreed to work with WDFW to allow for management of herds within the project area if this becomes a problem. In addition, the Applicant has agreed to allow controlled hunting within the project area. With this management, the likelihood of the project becoming an elk sanctuary is remote.

The project area is located south east of the Quilomene elk migratory corridor. Elk moving to winter range east of the project may avoid areas close to the project and travel farther to the north. Given that the project is located to the southeast of this movement corridor, the increase in distances needed to travel would not appear to be very large.

Since the project footprint would be similar under all scenarios, operational impacts would be expected to be similar under all scenarios.

Other Wildlife

Bat research at other wind plants indicates that migratory bat species are at some risk of collision with wind turbines, mostly during the fall migration season (Johnson et al. 2003b). It is likely that some bat fatalities would occur during operation of the project. Most bat fatalities found at wind plants have been tree-dwelling bats, with hoary and silver-haired bats being the most prevalent fatalities. Both species may use the forested habitats near the project site and may

migrate through the project. Some mortality of mostly migratory bats, especially hoary and silver-haired bats, is anticipated during operation of the project.

Although potential future mortality of migratory bats is difficult to predict, an estimate can be calculated based on levels of mortality documented at other wind plants. Using the estimates from other wind plants, operation of the project could result in approximately 100 to 400 bat fatalities per year. Actual levels of mortality are unknown and could be higher or lower depending on regional migratory patterns of bats, patterns of local movements through the area, and the response of bats to turbines, individually and collectively. Mortality will likely involve silver-haired and hoary bats, two relatively common migratory species.

The significance of this impact is hard to predict since there is very little information available regarding bat populations. Studies do suggest resident bats do not appear to be significantly impacted by wind turbines (Johnson et al. 2003b, Johnson 2003, Gruver 2002), since almost all mortality is observed during the fall migration period. Furthermore, hoary bat, which is expected to be the most common fatality, is one of the most widely distributed bats in North America. Preconstruction surveys to predict impacts on bats may be relatively ineffective, because current state-of-the-art technology for studying bats does not appear to be highly effective for documenting migrant bat use of a site (Johnson et al. 2003b).

As described for birds, larger turbines with a lower RPM and higher tip clearance may cause lower mortality than smaller, faster turbines, which are closer to the ground. Assuming this to be the case, the 104-turbine/3-MW scenario would cause the least amount of bat mortality, the 158-turbine/1-MW scenario would cause the most, and the 136-turbine/1.5-MW scenario would be in between.

Some small mammal fatalities can be expected from vehicle activity during operations. This is expected to be a relatively low number and is not expected to differ between scenarios.

No impacts on amphibians are anticipated during operations under any of the scenarios. Impacts on reptiles during operation are likely limited to some potential direct mortality due to vehicle collisions. While above ground, yellow-bellied racers and other snakes are likely mobile enough to escape most vehicles; however, short-horned lizards do not move fast over long distances and rely heavily on camouflage for predator avoidance. Some individual lizard fatalities can be expected from vehicle activity. Impacts on reptiles are expected to be similar under all scenarios.

Unique Species

Threatened and Endangered Species

As previously described, bald eagles are not expected to occur regularly within the project site but may occasionally pass through the site during winter and early spring. No bald eagle fatalities have been observed at other wind projects (Erickson et al. 2001), and many have estimated bald eagle use similar or higher than this site. Based on the apparent incidental use of the project area by bald eagles, impacts on the species cannot be meaningfully measured, and are expected to have a low probability of occurrence. Potential impacts would be similar for all scenarios.

Other Special Status Species

Golden Eagle

Although no active nests were documented during nest surveys, golden eagles were observed during fixed-point surveys throughout the year and golden eagles have nested historically within 2 miles of the project area. Overall use of the project area by golden eagles is relatively low compared to other wind plants where golden eagle fatalities have been documented. While the potential exists for golden eagles to collide with turbines, overall risks to golden eagle populations are considered low, and only a few individuals at most are expected to collide with turbines over the life of the project. As described under raptors above, larger turbines with lower RPMs and higher tip clearance may result in lower mortality for golden eagles; therefore, the potential for golden eagle mortality may be lowest for the 104-turbine/3-MW scenario, highest for the 158-turbine/1-MW scenario, and intermediate for the 136-turbine/1.5-MW scenario.

Sage Sparrow and Sage Thrasher

Most sagebrush and other shrub habitats within the project area occur on the sides of ridges and in drainages, while most turbines will be located on ridge tops lacking dense shrub habitats. Observations of breeding individuals indicate that the species generally does not fly within the Rotor Swept Area. The potential exists for the migrating individuals to collide with turbines. It is likely that the presence of turbines, roads and associated facilities will result in local displacement of breeding sage sparrows and sage thrashers from shrub habitats near project facilities. However, based on research in Minnesota, displacement effects will likely be limited to areas within 328 feet (100 meters) of turbines and associated facilities (Johnson et al. 2000a). As previously described, larger turbines with lower RPMs and higher tip clearance may result in lower mortality for diurnal birds, therefore the potential for mortality for these species may be lowest for the 104-turbine/3-MW scenario, highest for the 158-turbine/1-MW scenario, and intermediate for the 136-turbine/1.5-MW scenario.

Sage Grouse

Proposed mitigation measures include elimination of livestock grazing within parts of the project area (Section 27), which likely would improve residual grass cover and potential nesting, brood-rearing, and wintering habitat for sage grouse. It is not known what impact the project will have on seasonal movements and movements, if they exist, between the two existing populations. Relatively large blocks of shrub-steppe habitats still exist within WDFW and WDNR lands to the east of the project site that may serve to connect the two populations. The Quilomene Wildlife Area (17,803 acres) and the Whiskey Dick Wildlife Area (28,549 acres) and the private lands between them have vegetation similar to the project area, but lower in elevation. Controlled access to the project area during operations will limit human activity, and in fact, may reduce human disturbance levels compared to current levels. Impacts are expected to be similar under all scenarios.

Peregrine Falcon

Over the life of the project there is a very low risk that an individual peregrine falcon will collide with turbines; however, effects on peregrine falcon populations from the project are not expected under any of the scenarios.

Burrowing Owl

Although no burrowing owls have been documented within the project area during surveys, burrowing owl breeding areas have been designated by the WDFW 3–4 miles (5–6 km) southeast of the project area. The potential exists for breeding burrowing owls to occur within the project area. However, considering the lack of sightings within the project area, burrowing owls likely occur only occasionally within the project area, and no operations or maintenance impacts on burrowing owls are expected.

Other Bird Species

Mortality of these species may also occur as a result of collisions with turbines. Of these species, horned lark, American kestrel, and western meadowlark appear to have the highest collision risks due to their abundance at the project site. As previously described, larger turbines with lower RPMs and higher tip clearance may result in lower mortality for diurnal birds; therefore the potential for mortality for these species may be lowest for the 104-turbine/3-MW scenario, highest for the 158-turbine/1-MW scenario, and intermediate for the 136-turbine/1.5-MW scenario.

Mammals

The project occurs within the potential range of several species of federally and state protected mammals, which are unlikely to occur within the project area due to habitat constraints and/or uncertain population status in Washington. These species include Townsend's big-eared bat, long-legged myotis, and long-eared myotis. These species are not expected to occur within the project area and no impacts on these species are likely to occur under any of the scenarios.

Both white-tailed and black-tailed jackrabbits have been documented in the project area. The potential exists for individuals to be killed by vehicles on roads. This will be minimized by enforcing speed limits within the project site

Suitable habitat for three bat species, which are listed as federal species of concern, is present within the project area: fringed myotis, small-footed myotis, and Yuma myotis. However, only general descriptions of habitat requirements and potential distribution are available for the three species. Very little is known concerning the ecology of the three species, making it even more difficult to accurately predict potential impacts on these species. To date, documented fatalities of these species at wind projects within the U.S. have not been published. As previously described, larger turbines with lower RPMs and higher tip clearance may result in lower mortality for bats; therefore, the potential for mortality for these species may be lowest for the 104-turbine/3-MW scenario, highest for the 158-turbine/1-MW scenario, and intermediate for the 136-turbine/1.5-MW scenario.

Operation and Maintenance Impacts

Potential impacts from operations include and electrocution of birds, particularly raptors. As described in Section 3.5.4.2, perch guards would be installed and transmission lines would be spaced such that the potential for these impacts would be minimized.

3.5.2.3 Decommissioning Impacts

Impacts from decommissioning the project would be lower than those for construction, as no access roads would need to be built and thus there would be less heavy equipment and ground disturbance. The period of disturbance for decommissioning would also be much shorter than for construction. Vehicles would travel on established roadways, which would not impact habitat for special status species. Dismantling the project would eliminate avian and bat mortality caused by the presence of wind turbines. Wildlife habitat would have the potential to return to preproject conditions over time, and disturbed areas would be reseeded with appropriate seed mixes to accelerate revegetation of these areas.

3.5.3 Impacts of Alternatives

3.5.3.1 Impacts of Off-Site Alternatives

Kittitas Valley

Potential construction-related impacts include clearing and removal of vegetation, modification or loss of habitat, and construction noise. Habitat for upland game birds, passerines, hawks, small mammals, deer, elk, and reptiles would be impacted. Depending upon the scenario constructed, there would be 231 acres to 370 acres of temporary impacts to wildlife habitat and 93 to 118 acres of permanent impact to wildlife habitat under this alternative.

Ground-dwelling mammals would be temporarily displaced by construction activities and would lose the use of permanently disturbed areas. Elk and mule deer would likely avoid the project area during periods of construction activity. Reptile species (striped whipsnake and sharptail snake) may be affected by loss of habitat and direct mortality in construction zones.

During project construction, the possibility of mortality to bald eagles is considered negligible and very unlikely to occur.

Operation and maintenance impacts on wildlife species may include disturbance and fatalities associated with vehicle traffic, avoidance of turbines, and collisions with turbines and meteorological towers. It is expected that passerines may experience between 50 and 300 fatalities per year. Raptors such as American kestrels and red-tailed hawks are estimated to have an average of 3 to 6 fatalities per year. It is likely that some bat fatalities would occur from collision with wind turbines. Bald eagle use of this site is higher than that observed at the WHWPP site, however the potential for bald eagle mortality is considered low because of use patterns within the site and a lack of habitat features in the immediate vicinity of the proposed turbines.

Individuals of some species such as white-tailed and black-tailed jackrabbits and Merriam's shrew could be killed by vehicular traffic. Development of roads and project facilities may lead to fragmentation of habitat for big game populations.

Desert Claim

Construction related impacts to wildlife habitat would be similar to those described for both the WHWPP and the Kittitas Valley alternative with, an estimated 311 acres of temporary impacts

and 78 acres of permanent impacts to vegetation on the site. Construction activities could temporarily displace species from the project area due to noise and activity, and ground-dwelling species would be permanently displaced from those areas of permanent impact. Construction activities could cause mule deer to avoid the project area however adequate habitat in the surrounding area would compensate for this. Elk may respond to project construction by shifting their migratory path to the north; the corridor is likely large enough to accommodate this adjustment without hindering their migration. During project construction, the possibility of mortality effects to bald eagles is considered negligible and very unlikely to occur.

Operation and maintenance impacts would also be similar as those described for both the WHWPP and the Kittitas Valley alternative. Potential passerine mortality for this alternative has been estimated at approximately 140 to 220 birds per year and raptor fatalities have been estimated at approximately 3 to 4 per year. The potential for bald eagle mortality is low based on limited use of the site.

Project operations may reduce use of the area by wintering mule deer, although it is expected that mule deer would become habituated to the turbines and reoccupy the site. Elk may also become habituated or may continue to use areas further to the north during migration.

Individuals of some species may be killed by vehicular traffic, as described for both the WHWPP and the Kittitas Valley alternative.

Springwood Ranch

Wind plant construction could possibly affect birds through loss of habitat, disturbance and displacement effects due to human presence, noise, and potential fatalities from construction equipment. Disturbance effects would be expected to occur only if the construction activity took place near an active nest or a foraging area. If this was the case, breeding might be affected and foraging opportunities altered during the duration of construction.

Under this alternative it is estimated that there would be approximately110 acres of temporary impact to vegetation and 28 to 30 acres of permanent impact to vegetation, therefore this alternative would have less impact to wildlife habitat than the WHWPP, and both the Kittitas Valley and the Desert Claim alternatives.

Potential avian mortality has not been calculated for this alternative, and would be dependent upon the number of turbines built and the use of the area by avian species. Given the location of this site lower in the valley and closer to sources of water, fatality rates may not be comparable to either the WHWPP or the Kittitas Valley alternative, however baseline studies would be needed to determine this.

Given the assumed higher incidence of bald eagle use of this site due to proximity to the Yakima River and known winter use sites, the potential for bald eagle mortality under this alternative would be greater than described for the WHWPP.

Operation and maintenance activities could lead to avoidance of the area by mule deer, however it is possible that they would become habituated to the turbines and continue to utilize the area. Development would have little direct impact on elk, as there is little use of the site by elk and the riparian areas along the Yakima River and Taneum Creek would be protected by existing

regulations. Deer impacts would likely include disturbance and displacement impacts from construction activity.

Mortality of individuals associated with vehicular traffic may also occur.

Swauk Valley Ranch

Developing a wind plant on the Swauk Valley Ranch property would result in impacts on wildlife and habitat similar to those described for the Springwood Ranch Valley site. Given the close proximity of these sites and similarities in wildlife habitat between them, and assuming a project of similar magnitude was constructed, impacts would be expected to be similar. Since site-specific information for the Swauk Valley Ranch site is not available, however, potential impacts cannot be quantified.

3.5.3.2 Impacts of No Action Alternative

Under the No Action Alternative, the project would not be constructed or operated. However, development of a different nature could occur under Kittitas County's existing Comprehensive Plan and zoning regulations for the project area. Depending on the location, type, and magnitude of future developments at the project site, impacts on wildlife, or to threatened or endangered animal species could be similar to or even greater than the proposed action.

Other power generation facilities could be constructed and operated in the region to meet the long-term need for power. Constructing a base load gas-fired turbine generator, developing and extracting natural gas, and constructing natural gas pipelines to provide fuel to the generating facility could create impacts on wildlife, and threatened and endangered species. Construction of renewable energy facilities would also result in impacts to wildlife. The significance of such impacts would depend on the site-specific location and design of the facility.

3.5.4 Mitigation Measures

The potential direct wildlife impacts from the project can be grouped into two main categories, loss of habitat from construction and operation of the project, and potential mortality to individual birds or other animals from construction and operation of the project. The loss of habitat associated with the project can be further broken down into "temporary" and "permanent" habitat impacts. "Temporary" impacts are those arising from ground disturbance necessary for the construction of project infrastructure but that will be not be permanently occupied once construction is complete. Examples include trenches for underground electrical collector cables and construction staging areas. These areas will be disturbed during the construction period but will be reseeded and restored after construction is finished. The vast majority (approximately 75%) of the total area impacted by construction of the project would be temporarily disturbed (i.e., for less than one year.) The remainder (approximately 25%) will continue to be occupied by the project, such as string roads, turbine foundation pads, project substation, and the O&M facility. These are considered "permanent" impacts for the purpose of this analysis.

Potential indirect impacts on plants and animals are more diffuse and could be caused by habitat fragmentation, wildlife disturbance or avoidance of the project site, and introduction of noxious weeds and/or wildfire.

The Applicant has proposed a comprehensive mitigation package for plants and animals for this project. It consists of several categories of actions that include the following list, and described in greater detail in the following sections:

- Thorough study and analysis to avoid impacts;
- Project design features to minimize impacts;
- Construction techniques and Best Management Practices (BMPs) to minimize impacts;
- Post-construction restoration of temporarily disturbed areas;
- Operational BMPs to minimize impacts;
- Monitoring and adaptive management to minimize impacts during operations; and
- Protection and enhancement of on-site habitat; specifically providing protection for the life of the project for over 600 acres of shrub-steppe and riparian habitat in Section 27 and the fencing of springs in other areas of project to protect the springs from degradation by livestock.

3.5.4.1 Study and Analysis

Studies have been conducted on the project site by qualified wildlife biologists and data gathered was used in the project design to avoid impacts on sensitive populations. These studies, results of which are included as appendices to the ASC, include the following:

- Rare plant surveys;
- Habitat mapping;
- Avian use point count surveys;
- Aerial raptor nest surveys;
- Sage grouse surveys
- Big game surveys;
- Non-avian wildlife surveys;

The results and recommendations of these studies have been incorporated into the proposed design, construction, operation and mitigation for the project.

3.5.4.2 Project Design

The proposed design of the project incorporates numerous features to avoid and/or minimize impacts on plants and wildlife. These features are based on site surveys, experience at other wind power projects, and recommendations from consultants performing studies at the site. Features of the project that are designed to avoid or minimize impacts on wildlife include the following:

- Avoidance of construction in sensitive areas such as streams, riparian zones, wetlands, and forested areas;
- Avoidance of locating wind turbines in prominent saddles along the main Whiskey Dick Ridge;
- Minimization of new road construction by improving and using existing roads and trails instead of constructing new roads;
- Choice of underground (vs. overhead) electrical collection lines wherever feasible to minimize perching locations and electrocution hazards to birds;
- Choice of turbines with low RPM and use of tubular towers to minimize risk of bird collision with turbine blades and towers;
- Use of bird flight diverters on guyed permanent meteorological towers or use of unguyed permanent meteorological towers to minimize potential for avian collisions with guy wires;
- Equipping all overhead power lines with raptor perch guards to minimize risks to raptors; and
- Spacing of all overhead power line conductors to minimize potential for raptor electrocution.

Construction Techniques

Construction of the project has the potential to impact both habitat and wildlife in a variety of ways. The Applicant proposes the use of construction techniques and BMPs to minimize these potential impacts. These include the following:

- Use of BMPs to minimize construction-related surface water runoff and soil erosion (these are described in detail in Section 3.3.2.1, "Water – Impacts of the Proposed Action – Construction – Surface Water Runoff/Absorption");
- Use of certified "weed free" straw bales during construction to avoid introduction of noxious or invasive weeds;
- Flagging of any sensitive habitat areas (e.g., springs, raptor nests, wetlands) near proposed areas of construction activity and designation of such areas as "off limits" to all construction personnel;
- Development and implementation of a fire control plan, in coordination with local fire districts, to minimize risk of accidental fire during construction and respond effectively to any fire that does occur;
- Establishment and enforcement of reasonable driving speed limits (max 25 mph) during construction to minimize potential for road kills;
- Proper storage and management of all wastes generated during construction;
- Require construction personnel to avoid driving over or otherwise disturbing areas outside the designated construction areas;
- Limiting construction activities during winter months to minimize impacts on wintering big game;
- Designation of an environmental monitor during construction to monitor construction activities and ensure compliance with mitigation measures.

Postconstruction Restoration

All temporarily disturbed areas which have been cleared of vegetation will be reseeded with an appropriate mix of native plant species as soon as possible after construction is completed to accelerate the revegetation of these areas and to the prevent spread of noxious weeds. The Applicant will consult with Washington Department of Fish and Wildlife regarding the appropriate seed mixes for the project area.

3.5.4.3 Operational BMPs

During project operations, appropriate operational BMPs will be implemented to minimize impacts on plants and animals. These include the following:

- Implementation of a fire control plan, in coordination with local fire districts, to avoid accidental wildfires and respond effectively to any fire that might occur;
- Establishment and enforcement of reasonable driving speed limits (max 25 mph) during operations to minimize potential for road kills;
- Operational BMPs to minimize storm water runoff and soil erosion;
- Implementation of an effective noxious weed control program, in coordination with the Kittitas County Noxious Weed Control Board, to control the spread and prevent the introduction of noxious weeds;
- Identification and removal of all carcasses of livestock, big game, etc. from within the project that may attract foraging bald eagles or other raptors;
- Control public access to the site to minimize disturbance impacts on wildlife, especially in the winter months;
- Allow limited and controlled hunting on the site and allow WDFW access to the site to manage big game herds and minimize potential big game damage to nearby agricultural lands.

3.5.4.4 Monitoring and Adaptive Management

The Applicant plans to convene a Technical Advisory Committee (TAC) to evaluate the mitigation and monitoring program and determine the need for further studies or mitigation measures. The TAC will be composed of representatives from Washington Department of Fish and Wildlife, EFSEC, Kittitas County, local interest groups (e.g., Kittitas Audubon Society), project landowners, and the Applicant. The role of the TAC will be to review results of monitoring studies to evaluate impacts on wildlife and habitat, and address issues that arise regarding wildlife impacts during operation of the project. The post-construction monitoring plan will be developed in coordination with the TAC.

The Applicant proposes to develop a postconstruction monitoring plan for the project to quantify impacts on avian species and to assess the adequacy of mitigation measures implemented. The monitoring plan will include the following components: 1) fatality monitoring involving standardized carcass searches, scavenger removal trials, searcher efficiency trials, and reporting of incidental fatalities by maintenance personnel and others; and 2) a minimum of one breeding

season raptor nest survey of the study area and a 1-mile buffer to locate and monitoring active raptor nests potentially affected by the construction and operation of the project.

The protocol for the fatality monitoring study will be similar to protocols used at the Vansycle Wind Plant in northeastern Oregon (Erickson et al. 2000) and the Stateline Wind Plant in Washington and Oregon (FPL et al. 2001).

3.5.5 Significant Unavoidable Adverse Impacts

With mitigation, no significant unavoidable adverse impacts are anticipated for birds or other wildlife. The mitigation parcel for replacement of permanent and temporary habitat loss from the project exceeds the mitigation ratios defined in the WDFW Wind Power Guidelines. Protection of springs through livestock exclusion will provide additional mitigation for impacts on wildlife. It is currently not clear what indirect impacts the project may have on big game winter range and big game movements. It is anticipated that the mitigation (exclusion of livestock from springs) and elimination of grazing on the mitigation parcel will improve big game habitat. Controlled access and controlled hunting on the site will allow WDFW to properly manage the herds, which should eliminate the potential for creating a refuge for big game and minimize stress to big game in the winter. The level and effect of disturbance impacts on big game from maintenance operations is not known, and may or may not be significant.